

5<sup>th</sup> International Conference on

# Tissue Engineering & Regenerative Medicine

September 12-14, 2016 Berlin, Germany

## Design of polycaprolactone based bio-composite scaffolds for bone tissue engineering: A brief overview

Saeid Tajbakhsh<sup>1</sup> and Faezeh Hajiali<sup>2</sup><sup>1</sup>University of Tehran, Iran<sup>2</sup>Sharif University of Technology, Iran

Polycaprolactone (PCL) is an aliphatic polyester, bioresorbable and biocompatible polymer which are generally used in pharmaceutical products and wound dressings. Recently, PCL has received increasing attention due to its good drug permeability, biocompatibility, solubility, exceptional blend compatibility properties and ability to maintain its mechanical and physical properties long enough for tissue growth. Therefore, these properties facilitate the manufacture and manipulation of PCL into a large range of scaffolds. However, its mechanical strength, bioactivity and osseointegration are not optimal to be used as a substrate. The incorporation of bioactive ceramic nanomaterials including hydroxyapatite (HA) and related calcium phosphates (CaP), bioactive glasses (BG) in particular Bioglass®, and silicon dioxide (SiO<sub>2</sub>) not only improves the mechanical strength and degradation behavior of PCL but also forms a biologically active layer on the surface of scaffold which provides the interfacial bonding with tissue. Recent proposed approaches based on developing bioactive PCL-based composites are reviewed, and the biodegradability, mechanical properties, *in vitro* and *in vivo* bioactivity assessments of PCL-based bio-composite scaffolds containing different bioactive ceramic nanomaterials are discussed in brief. This review is written with an aim to compile the works done in this field and focus on characteristics and applications of PCL/HA, PCL/CaP, PCL/BG and PCL/SiO<sub>2</sub> in the field of bone tissue engineering. The scaffolds which were reviewed here might demonstrate the optimal solution and the suitable PCL-based composite scaffolds for bone regeneration strategies.

### Biography

Saeid Tajbakhsh is a graduate student in the field of Chemical Engineering, Biotechnology at the University of Tehran. He has completed his Bachelor's degree from Sharif University of Technology. He is currently working on metabolic modeling and other aspects of biotechnology.

saeid.tajbakhsh@yahoo.com

### Notes: